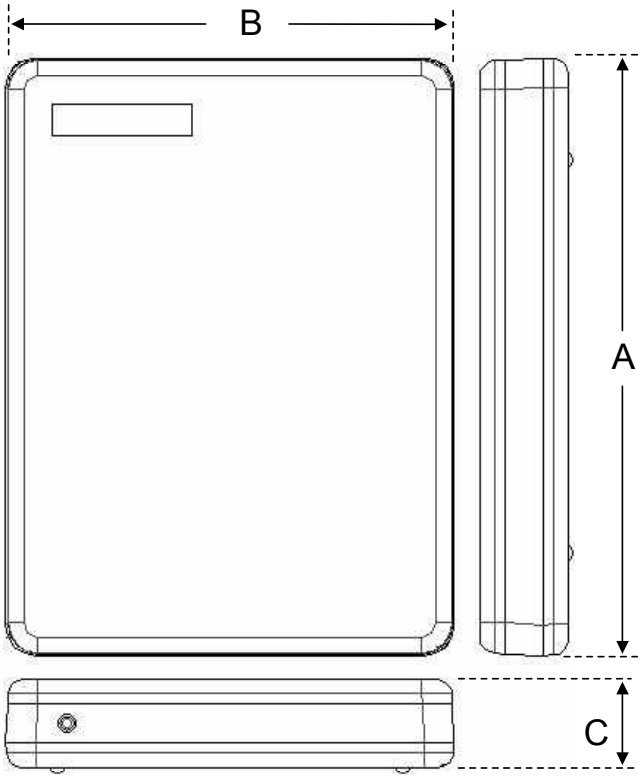
TS40GSJ18

1.8” StoreJet Portable HDD 40GB

Description

TS40GSJ18 is a USB 2.0 40GB Portable Hard Disk. This device is a 40GB TOSHIBA 1.8” hard disk drive (HDD) installed in a Portable Hard Disk Enclosure. It is designed to expedite exchanging huge amounts of data between this device and any desktop or notebook computers.

Outline



System Requirements

- Desktop or notebook computers with USB port
- One of following operating systems:

  Win® 98, Win® Me, Win® 2000, Win® XP, Mac™ OS

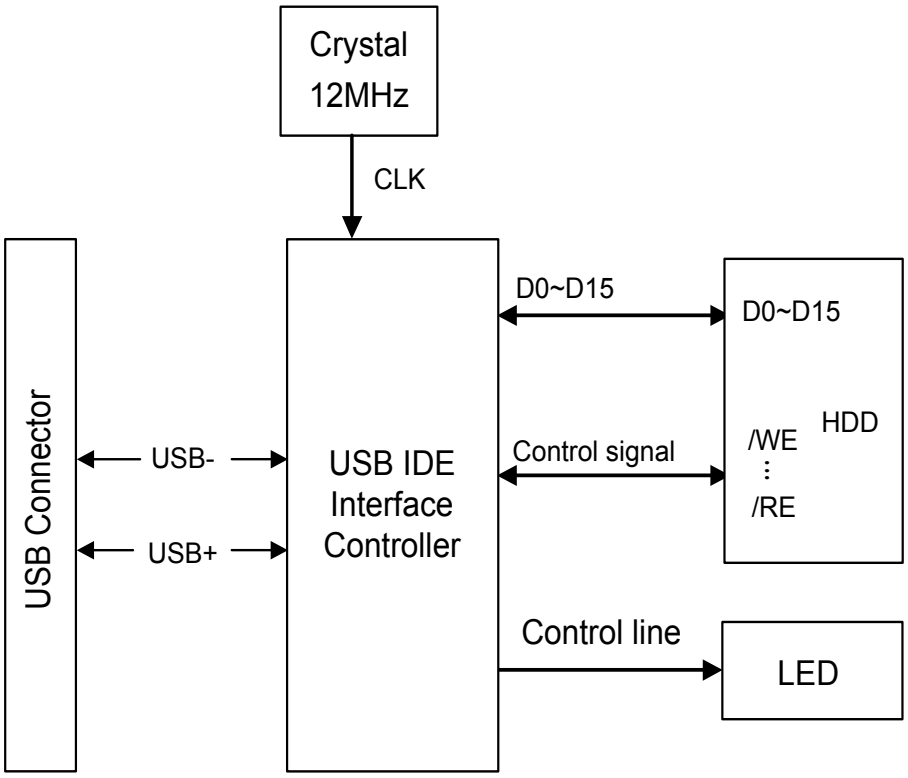
Features

- 100% Compatible with USB Interface in Windows or Mac
- USB connection for true Plug and Play
- Single Power Supply: 5V ± 10%
- Connector Durability: 5000 times
- Recommended operating temperature : 5℃ – 60 ℃
- Supports Resume Suspend and Low power modes
- Compliant with USB specification version 1.1 & 2.0
- Support 1.8” hard disk drive. (TOSHIBA)
- LEDs indicate Power On and Data Traffic

Dimensions

Side	Millimeters	Inches
A	95.00 ± 1.00	37.40 ± 0.04
B	71.50 ± 1.00	28.15 ± 0.04
C	15.00 ± 1.00	5.90 ± 0.04

Block Diagram



Pinouts

Pin No.	Pin Name
01	VCC
02	USB-
03	USB+
04	VSS

Pin Identification

Symbol	Function
USB-	USB differential signal:
USB+	The pairs are used to transmit Data/Address/Command
VSS	Ground
VCC	USB power input

Specification

Size	**L x W x H**	**95mm x 71.5mm x 15mm**
Weight		**130 g**
Temperature	**Operating**	**5℃ – 60 ℃**
Shock resistant	**Operating**	**250G**
	Non-Operating	**1000G**
Capacity		**40 GBytes**
Sustained transfer rate	**Read**	**16.6 MB/sec**
	Write	**16.4 MB/sec**
Bus transfer rate	**USB 2.0 Full Speed**	**480 Mb/sec**
Certificate		**CE, FCC, BSMI**

Electrical DC Characteristics (Ta=0°C to 70°C, Vcc=3.3V±10%)

Parameter	Symbol	MIN	TYP	MAX	Unit
Power Supply	VDD	3	3.3	3.6	V
Input Voltage	VIH	0.9xVDD	--	5	V
	VIL	-0.3	--	0.5xVDD	V
Output Voltage	VOH	VDD-0.4	--	--	V
	VOL	--	--	0.4	V
Input leakage current	ILK	-1	--	1	μA
Working Current	IRW	--		--	mA
Operating Temperature	Ta	0		70	°C
Storage Temperature	Ts	-55		+150	°C
IO output current	IOH	--	4	--	mA
	IOL	--	4	--	mA

AC Characteristics

Parameter	Symbol	MIN	TYP	MAX	Unit
Input rising delay	TPIlh	0.35(2PF)	0.4(4PF)	0.54(8PF)	ns
Input falling delay	TPIhl	0.46(2PF)	0.53(4PF)	0.64(8PF)	ns
Output rising delay	TPOlh	1.35(10PF)	2.41(30PF)	2.59(50PF)	ns
Output falling delay	TPOhl	1.61(10PF)	2.41(30PF)	3.21(50PF)	ns

Hard Drive Basic Specifications:

Principal Specification

MODEL	MK4004GAH
Formatted Capacity (gigabytes)	40.000
Servo design method	Sector Servo
Recording method	32/34 TC-EEPR4+PP
Recording density	
Track / mm (TPI)	3465 (88.0k)
Bit / mm (BPI)	27.4k (695k) max.
Flux change / mm (FRPI)	29.1k (738k) max
Number of disks	2
Number of data heads	4
Number of user data cylinders	38,160
Bytes per sector	512

Performance

Access time (msec) <*1>	
Track to track seek <*2>	3
Average seek <*3>	15
Max. seek <*4>	26
Rotation speed (RPM)	4,200 ± 0.1%
Average Latency Time (msec)	7.14
Internal Transfer rate (Mbits / sec)	125.5 – 253.1
Host Transfer rate (Mbytes / sec)	
Ultra DMA mode	100
PIO mode	16.6
Sector Interleave	1:1
Track skew	Yes
Buffer size (Mbytes)	2
Cache	Read Ahead Cache Write Cache
Start time <*5> (Up to Drive Ready)	3.5 sec (Typical) 20 sec (Maximum)
Recovery time from Stand- by <*5>	3 sec (Typical) 20 sec (Maximum)
Command Overhead (msec)	1

<*1> Under the condition of normal voltage, 25°C normal temperature and bottom side down.
<*2> Average time to seek all possible adjacent track without head switching.
<*3> Weighted average time to travel between all possible combination of track calculated as below.
Weighted average access time = [Sum of P(n)*t(n)] / [Sum of P(n)], n = 1 to N.
Where, N; Total number of tracks.
P(n); Total number of seek for stroke n [= 2*(N - n)].
t(n); Average seek time for stroke n.
Average seek time to seek to stroke n is the average time to 1,000 seeks for stroke n, with random head

<*4> Average time for 1,000 full stroke seeks with random head switches.
<*5> Typical values are for the condition of normal voltage, 25°C normal temperature and placing bottom side down. Maximum values are for all conditions specified in this document.

Supply Voltage

Allowable voltage	3.3V ± 5%
Allowable noise/ripple	70 mV p-p or less

Power Consumption

	Average (note1)
	MK4004GAH
Start	**1.3 W Maximum**
Seek (note2)	**1.4 W Typical**
Read / Write (note3)	**1.4 W Typical**
Active idle (node4)	**0.6 W Typical**
Low power idle (note5)	**0.4 W Typical**
Stand-by (note6)	**0.2 W Typical**
Sleep	**0.08 W Typical**

(note 1) Under normal condition (25°C, 101.3 kPa (1,013 mb)) and 3.3V ± 0%.
(note 2) The seek average current is specified based on three operations per 100 ms.
(note 3) The read/write current is specified based on three operations of 63 sector read/write per 100 ms.
(note 4) Motor is rotating at normal speed but none of Read, Write or Seek is executed.
(note 5) Motor is rotating at normal speed but heads are unloaded on the ramp.
(note 6) Motor is not rotating and heads are unloaded on the ramp.

Temperature and Humidity

Operating	5°C- 60°C Gradient 15°C / Hour maximum
Non- operating	- 20°C- 65°C Gradient 15°C / Hour maximum
Under shipment	- 40°C- 70°C Gradient 30°C / Hour maximum (Packed in Toshiba's original shipping package.)

Operating	8%- 90% R.H. (No condensation.)
Non- operating	8%- 90% R.H. (No condensation.)
Under shipment	5%- 90% R.H. (Packed in Toshiba's original shipping package.)
Max. wet bulb	29°C (Operating) 40°C (Non- operating)

Shock

Operating	2,450 m/s^2 (250G) 2 msec half sine wave Repeated twice maximum / second No unrecoverable error.
Non- operating	9,800 m/s^2 (1000G) 1 msec half sine wave Repeated twice maximum / second No unrecoverable error.
Under shipment	70 cm free drop No unrecoverable error. Apply shocks in each direction of the drive's three mutually perpendicular axes, one axis at a time. (Packed in Toshiba's original shipping package.)

Acoustics (Sound Power)

MK4004GAH	
24dB	**For idle mode (Spindle in rotating).**
29dB	**Randomly select a track to be sought in such a way that every track has equal probability of being selected. Seek rate(ns) is defined by the following formura:** **ns = 0.4 / (tT = tL)** **tT is published time to seek from one random track to another without including rotational latency;** **tL is the time for the drive to ratate by half a revolution.**

Mean Time to Failure (MTTF)

MTTF	300,000 hours
Conditions	
Power on hours	2,800 hours (200 days x 14 hours) / year)
Operating hours	600 hours (200 days x 3 hours) / year)
Seek hours	1.30 x 10^6 seeks / month
Number of load / unload	70 times / hour (60,000 times / year)
Environment	Normal (25^{o}C, 101.3 kPa (1,013 mb))

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